UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/687,453	10/13/2000	James M. Van Dyke	18659-23	1345

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EXAMINER
TUNG, KEE M

ART UNIT	PAPER NUMBER
2676	15

DATE MAILED: 11/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _14 October 2003_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _32-67_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _32-67_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)
since a specific reference was included in the first sentence of the specification or in an Application Data Sheet.
37 CFR 1.78.

    a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific .
reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _13_.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other:

DETAILED ACTION

The REC filed 10/14/03 has been considered in preparing this Office action.

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 32-43, 45-48, 55-62 and 64-67 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Nielsen et al (6,104,417 hereinafter Nielsen") in view of Aleksic

et al (6,469,703 hereinafter "Al").

Nielsen teaches a graphics system (Figs. 2A and 2B) comprising a graphics

memory (unified system memory 202 which dividing into a plurality of buffers, such as,

frame buffer for storing graphics data, texture buffer for storing texture data); a graphics

memory access bus (the bus connected between USM 202 and the memory clients

206-215) connected to said graphics memory; a plurality of graphics processing units

(such as, memory clients 206-215) request to access to the system memory via

memory controller (204); and a memory controller (204) connected between said

graphics memory access bus and said plurality of graphics processing units, said

memory controller providing a non-partitioned view of said graphics memory to said

plurality of graphics processing units. The memory controller (Fig, 4) includes a plurality

of client queues and an arbiter for providing priority access to the unified main memory.

However, Nielsen fails to explicitly teach or suggest said memory controller dividing said

graphics memory access bus into individual bus partitions, each of which is a fraction of

the graphics memory access bus size, said memory controller partitioning information

within said graphics memory into independently accessible memory partitions, said

memory controller routing data from said independently accessible memory partitions to

said plurality of graphics processing units via said individual bus partitions. These are

what AI teaches. AI teaches a high performance computer graphics system (Fig. 1)

comprising a CPU (110); a system/video controller (120 and Fig. 7) connected to a

unified system memory (140) via two memory bus channels (122 and 123); each

channel includes a 64-bit data bus connected to the respected banks of memory (col. 8,

lines 31-35); the system/video controller includes a data route (620); graphics engine

(640); a memory controller (630); the memory controller provides 128-bit data to the

graphics engine by either accessing channels CH0 and CH1 simultaneously or access

channels of data separately, and buffering the data until the fill 128-bit data word is

available (col. 8, line 60 to col. 9, line 2) and the memory controller selects one or more

of said individual bus partitions to route data in response to a data request from a

graphics processing unit of said plurality of graphics processing units and maps data to

said independently accessible memory partitions in an interleaved fashion to balance

memory load across said memory partitions (see Figs. 2A and 2B, col. 4, lines 26-59

and Fig. 7).. It would have been obvious to one of ordinary skill in the art at the time the

present invention was made to combine the teachings of AI into the system of Nielsen in

order to allow simultaneous access to the individual memory partitions and thus to

achieve a high performance graphics processing system as taught by AI (col. 2, line 58

to col. 3, line 3). Therefore, at least claims 32-41, 43, 45, 48, 55-62, and 64-67 would have been obvious.

As per claim 42, the combined system fails to explicitly teach each graphics processing unit has a sub-request ID. It would have been obvious to one of ordinary skill in the art at the time the present invention was made to implement the teachings to include a request ID in order to properly identify each client.

As per claims 46 and 47, the combined system fails to explicitly suggest or teach a selected graphics processing unit access data in an out-of-order fashion. It would have been obvious to one of ordinary skill in the art at the time the present invention was made to implement the teachings of Nielsen and Al because this is old and well known and well used in parallel processing architecture in order to more efficiently balance the load among the processing units and further to be able to accept the data as soon as the data is available without wait for other to finish.

3.   Claims 44, 49-54 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nielsen et al (6,104,417 hereinafter Nielsen") and Aleksic et al (6,469,703 hereinafter "Al") as applied to claims 32 and 55 above, and further in view of Ng (6,205,524).

The teachings of Nielsen and Al are given in previous paragraph of this office action. However, the combined system fails to explicitly teach said arbiter circuit treats said sub-set of low-bandwidth graphics processing units as a single client. This is what Ng teaches. Ng teaches real time agents assigned a fixed high priority and all non-real time agents assigned a last slot as a single client (abstract). It would have been

obvious to one of ordinary skill in the art at the time the present invention was made to combine the teachings of Ng into the combined system of Nielsen and Al in order to solve all the problems among in prior art as taught by Ng (col. 1, line 49 to col. 3, line 65). Therefore, at least claims 44 and 63 would have been obvious.

As per claims 49-54, Ng teaches different priority policies (Fig. 6 and col. 1, lines 18-39).

Response to Arguments

4.   Applicant's arguments with respect to claims 32-67 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kee M Tung whose telephone number is 703-305-9660. The examiner can normally be reached on Tuesday - Friday from 5:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 703-308-6829. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

Kee M Tung
Primary Examiner
Art Unit 2676